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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,028	10/31/2003	David Sikharulidze	1509-467	7131

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EXAMINER

HON, SOW FUN

ART UNIT PAPER NUMBER

1772

DATE MAILED: 04/17/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<p align="center"><b>Advisory Action</b> <b>Before the Filing of an Appeal Brief</b></p>	<b>Application No.</b> 10/698,028	<b>Applicant(s)</b> SIKHARULIDZE, DAVID	
	<b>Examiner</b> Sow-Fun Hon	<b>Art Unit</b> 1772	

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 05 April 2006 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.  
 b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**NOTICE OF APPEAL**

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
 (a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
 (b) ☐ They raise the issue of new matter (see NOTE below);  
 (c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
 (d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
 5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
 6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
 7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
 The status of the claim(s) is (or will be) as follows:  
 Claim(s) allowed: \_\_\_\_\_.  
 Claim(s) objected to: \_\_\_\_\_.  
 Claim(s) rejected: \_\_\_\_\_.  
 Claim(s) withdrawn from consideration: \_\_\_\_\_.

**AFFIDAVIT OR OTHER EVIDENCE**

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
 9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of a good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
 10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See attachment to advisory action.  
 12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). \_\_\_\_\_.  
 13. ☒ Other: PTO-892.

***Advisory Action***

***Replacement Drawings***

1. The replacement drawings dated 04/05/06 are not entered. These drawings are not accepted for the following reasons. Figs. 2, 3a-6b, dated 04/05/06, still have some units which are hard to read due to their small size, such as the labels on the top (mv?, ms?) and on the side (+2/4?). Figs. 7b-d, 9a-12, dated 04/05/06, show structures which are undecipherable. While Fig. 12 dated 04/05/06, is relatively better than the one dated 10/27/05, it still fails to do HP photocopying technology justice.

***Request for Reconsideration***

2. The request for reconsideration has been considered and deemed unpersuasive.

3. Applicant argues that the same effects that are achieved with the FLC materials are not attained in the nematic LC materials that Takano employs because nematic LCs do not exhibit bistable features and respond equally to electrical pulses with different polarity.

Applicant is respectfully apprised that Eguchi is the primary reference that teaches ferroelectric LCs, and prior art which uses nematic LCs. Furthermore, nematic LCs which have dielectric anisotropy and are useful as ferroelectric LCs, are known to exhibit bistable features, responding differently to electrical pulses with different polarity, as evidenced by US 5,457,235 and US 5,626,791.

4. Applicant argues that the Takano device uses 200 nm particles for a strong scattering effect, appearing to be similar to the nematic device mentioned by Crawford,

Art Unit: 1772

US 5,956,113, which also exhibits scattering effect and is driven by AC voltage, and hence is very different from the Eguchi device, and cannot be a basis for modifying the Eguchi device for forming a nematic bistable device with orientational electrooptical effect.

Applicant is respectfully apprised that Takano is the secondary reference which teaches that the silica particles are added to the liquid crystal for the purpose of allowing low voltage driving of the liquid crystal cell, to provide the display with a high contrast and improved response speed (abstract). The fact that Applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

5. Applicant argues that it is well known that nematic LC molecules are switched zenithally, and that consequently, in the Eguchi cell, in which both surfaces have planar alignment, bistable switching of nematic LC is not optically distinguishable, since after applying unipolar pulses with different polarity, the cell adopts equal zenithally reverted molecular orientations, which are not optically distinguishable.

Applicant is respectfully apprised that in the embodiments of Eguchi wherein the second surface alignment (rubbing uniaxial alignment treatment, column 7, lines 1-5) on an inner surface of the other of said cell walls (13b, column 4, lines 63-65) induces adjacent molecules of said liquid crystal molecules to adopt a second orientation which is different from said first orientation (rubbing directions which may be anti-parallel to each other or cross each other with a small intersection angle, column 7, lines 1-10), the

Art Unit: 1772

ferroelectric nematic liquid crystal are known to adopt different molecular orientations in response to unipolar pulses with different polarity, the twist angle of the liquid crystal molecules between the two opposing inner surfaces of the cell, being different, due to the dielectric anisotropy of the molecules, providing optically distinguishable states, as evidenced by US 6,867,836 and US 7,006,165.

6. Applicant argues that the devices of the prior art references are different by geometry, used materials, operational principles and optical performance, which combination does not lead one of ordinary skill in the art to the combination of independent claims 1 and 16.

Applicant is respectfully apprised that both references, Eguchi and Takano, are directed to liquid crystal electrooptical devices, specifically to a high contrast ratio and response speed (Eguchi, switching process, column 3, lines 43-48, Takano, abstract), and are thus analogous art. The combination of Eguchi as the primary reference, which teaches the bistable ferroelectric liquid crystal display, and Takano as the secondary reference which teaches the use of fine silica particles to provide high contrast and response speed to the liquid crystal display, would thus lead one of ordinary skill in the art to the combination of independent claims 1 and 16.

7. Applicant argues that regarding claim 14, the Eguchi teaches that the cell is sandwiched between **a pair of 90 degree cross Nicol polarizers**, emphasis added, and hence does not teach that a polarizer is used to distinguish between different optical states of the liquid crystal.

Applicant is respectfully apprised that Applicant's specification discloses the use of crossed polarizers in paragraph [0026] line 2. Polarizers are normally provided in pairs to form the crossed structure.

8. Applicant argues that Eguchi employs FLC materials wherein molecules switch from one state to another due to electrical dipole moment, wherein the switching operation untwists the spiral of FLC material lying along the cell, such that the molecules move in a conical path to switch between stable states in response to pulses with opposite polarity in both states, such that in both states, the molecules are planar aligned, the unipolar pulses with different polarity providing two equal zenithally reverted molecular orientations which are not optically distinguished.

Applicant is respectfully apprised that Eguchi teaches that there is a difference in angle between the orientation directions of the first and second states (33a, 33b, Fig. 3), wherein a tilt angle is provided for one of the states (alignment, column 10, lines 10-15). Furthermore, Eguchi teaches that the both magnitude and duration of the electrical pulse applied is varied (Ea, Eb, column 8, lines 40-50, Fig. 11), and that there is an improved contrast ratio between the two states (column 3, lines 43-48). Thus Eguchi does not appear to teach two equal zenithally reverted molecular orientations which are not optically distinguished. Applicant has not provided data to support Applicant's statement.

9. Applicant argues that adding nanoparticles stabilizes the electrical field induced molecular orientation, because the cell modulates polarized light, and that because scattering effects negatively act on optical performance of the device defined by claims

Art Unit: 1772

6 and 11-13, one of ordinary skill in the art would not have modified Eguchi as a result of the applied secondary references since the devices of Eguchi, Takano and Crawford operate differently from each other and produce different optical effects.

Applicant is respectfully apprised that since both Crawford and Takano teach that a good light scattering state is desirable in a bistable liquid crystal display, it is unclear what Applicant means by arguing that scattering effects negatively act on the optical performance of Applicant's device. Furthermore, Eguchi is the primary reference which teaches the bistable ferroelectric liquid crystal display, and along with the secondary references Takano and Crawford, is directed to improving the contrast ratio and response of the liquid crystal display device (Eguchi, switching process, column 3, lines 43-48; Takano, abstract; Crawford, operate at reduced drive voltages and high contrast, column 2, lines 46-49). The three references are thus analogous art.

10. Applicant argues that Bryan Brown is not bistable and adopts different monostable LC alignments depending on the magnitude of the applied electric field, and wherein the nematic liquid crystal has negative dielectric anisotropy.

Applicant is respectfully apprised that Eguchi is the primary reference that teaches the bistable ferroelectric liquid crystal device, wherein the alignment directions can differ on the opposing alignment surfaces, and that Bryan Brown is the secondary reference that teaches that the first surface alignment induces planar alignment (page 3, lines 13-20) and the second alignment surface induces a second alignment direction which can be planar, wherein the first and second surface alignments are at substantially 90 degrees to each other (figure (a)  $v=v_2$ , directions are approximately

Art Unit: 1772

orthogonal, abstract), so that the alignment direction, which is non-parallel to the alignment direction of the opposite planar surface, induces a twist in the liquid crystal, which is accompanied by a change in optical transmission, for the purpose of providing a device which acts as an optical switch (page 6, lines 12-20). Bryan Brown is directed towards improving contrast and response time of the liquid crystal display (page 14, lines 10-25), and is therefore analogous art.

11. Applicant argues that Thurston has no indication of switching between the vertical and the horizontal states.

Applicant is respectfully apprised that Thurston teaches that dissolving (mixing) a pleochroic dye into the liquid crystal provides optical contrast between the vertical and horizontal states (column 2073a, first paragraph below Fig. 6). Thus although Thurston does not specifically teach switching between vertical and horizontal states, the very fact that optical contrast is demonstrated between the vertical and horizontal states, implies that switching occurs.

12. Applicant argues that in claim 15 of Applicant's structure, the nanoparticles suspended in pure nematic LC exhibit an electrical charge.

Applicant is respectfully apprised that the limitation of "nanoparticles suspended in pure nematic LC exhibits an electrical charge" is not recited in claim 15.

Any inquiry concerning this communication should be directed to Sow-Fun Hon whose telephone number is (571)272-1492. The examiner can normally be reached Monday to Friday from 10:00 AM to 6:00 PM.



Art Unit: 1772

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon, can be reached at (571)272-1498. The fax phone number for the organization where this application or proceeding is assigned is (571)273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*S. Hon.*  
Sow-Fun Hon

04/14/06

*Donald J. Loney*  
**DONALD J. LONEY**  
**PRIMARY EXAMINER**